

Title of Investigation:-

**"CARTOGRAPHIC RESEARCH IN EREP PROGRAMME
 FOR SMALL SCALE MAPPING".**

NASA H.O. Proposal Reg. No. SR.9625.

1. Data Received.

- 1-1 S.190A. 70 mm. negative and positive film transparencies of 9 frames received July 1974. Of these nine frames, five have been selected for use and the remainder rejected for excessive cloud.
- 1-2 S.190B. 5" film positive transparencies of 15 frames received. July 1974. Nine of these frames have been chosen for use and the other six rejected because of cloud.

2. Proposed Programme.

It is proposed to carry out aerial triangulation of the photography and adjustment of the results on to geodetic control. Areas will then be selected for photogrammetric mapping. This work will be performed using established aerial survey techniques and standard stereo-photogrammetric equipment.

- 2-1. S.190A Photography.
 The nine inch enlargements will be used for this part of the programme. Because of the need to wait for the delivery of this material, work will be started on the S.190B photography first. Geodetic control in the area covered by this photography is sparse, but sufficient appears to be available for the purpose, although nothing is yet known about its quality. One spectral band will be selected for the aerial triangulation and the plotting. The other bands will be used to aid the interpretation of detail. It is intended that any available maps of the area will be used to aid the interpretation, but that the only detail to be shown on the plots will be that which can actually be seen on the photography.

2-2. S.190B Photography.

The original 5 inch film positive transparencies will be used for this part of the programme. Geodetic control in this area is expected to be more plentiful and of better quality than in the other. It is tentatively proposed that this photography should be used to map at a scale of 1/250,000 with contours at 500 m. vertical interval, but this decision is by no means final.

2-3. ERTS-1 Imagery.

ERTS imagery of the area is on order from the EROS Data Center and trial plots will be produced of the appropriate areas for comparison with the 'Skylab' plots.

3. Geodetic Control.

The plan co-ordinates and heights of prominent mountain peaks are currently being obtained from available sources.

4. Trial Plotting of S.190B Photography.

As a trial to establish the feasibility of photogrammetric plotting from this photography, a pair of photographs was set up in a Wild A5 Autograph stereo-plotter and a plot produced at approximately 1/250,000 scale with contours at about 500 m. vertical interval. The exact scale of the stereo model was not known, but the calculated scale based upon the satellite altitude and the geographical co-ordinates of the image centres was sufficiently close for the purpose. Since the focal length of the camera is much greater than that used for normal aerial photography, an affine solution had to be used which resulted in the stereo-model having a horizontal scale 2 1/2 times as great as the vertical scale. Compensation for this scale differential was made in the operation of the instrument. The results of this trial were very satisfactory and establish that a valuable map can be produced from this photography using standard photogrammetric equipment.

5. Resolution and quality of Photography.

In a letter received in March 1974 from ⁴¹our Technical Monitor, we were informed that the sun angle on this photography was very low and that this might invalidate its use for the purposes of this project. We have examined the photographs and although there is some very dense shadow in the deepest valleys, the photography is quite adequate for our purposes. Some of the deepest narrow valleys in this region are probably never clear of shadow at this time of the year. The low sun angle is an advantage on the snow covered areas since it throws up small shadows which help to accentuate details and give a much firmer impression of ground shape.

While no detailed study has yet been made of the detail which can be extracted from this photography, very small details have been seen. These include tracks which are probably no more than 5 metres wide and possibly less. An area of terraced cultivation has also been noted. The individual terraces can be seen although they are much too small to delineate separately.

It has been noted that the S.1903 photography falls off in definition in the corners.

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